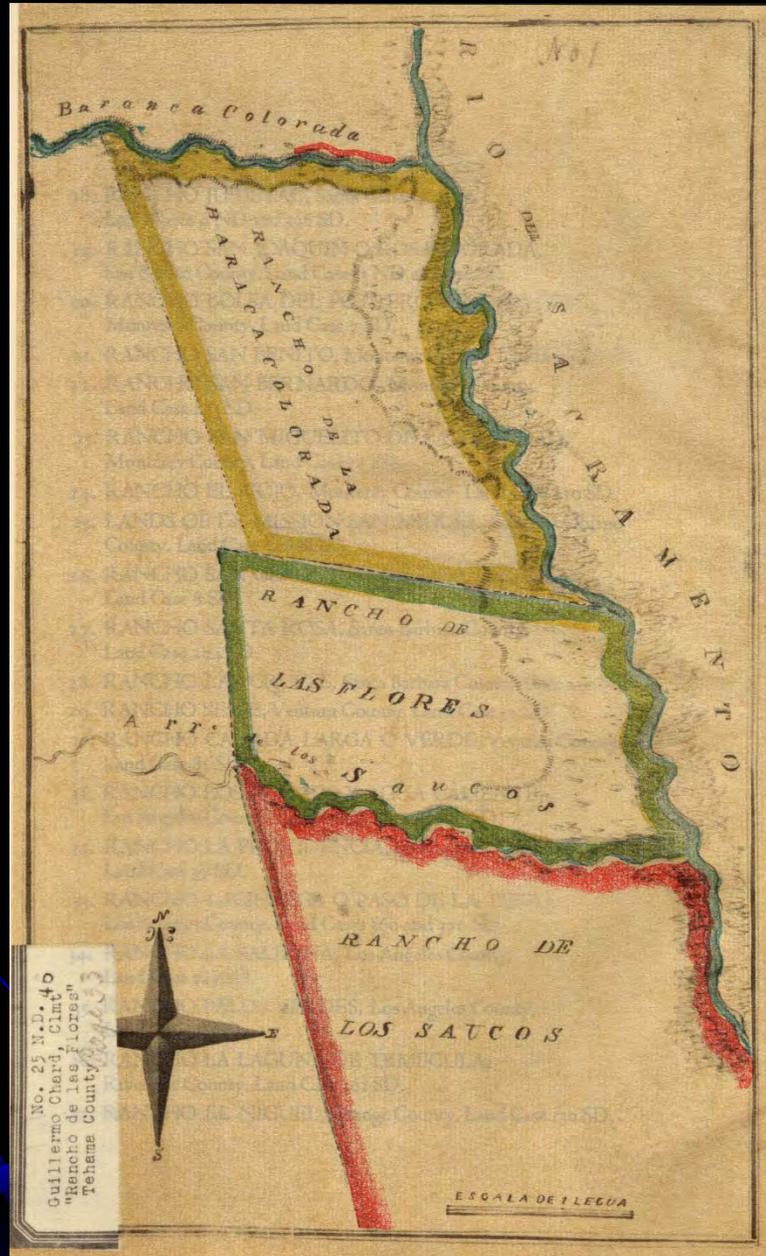


Diseño: Rancho de las Flores



Wildflower carpets in the Central Valley

Frémont. Sacramento Valley, 1844 "The higher prairies.....presented unbroken fields of yellow and orange colored flowers....."

William Perkins (1849-1852)the whole country is one immense flower bed. The hills look like gigantic bouquets, and the llanos like a huge Persian carpet.

Hittell 1874. "Along the railroads on either hand runs continuously the rich radiant bloom. Your sight becomes pained, your very brain is bewildered, by watching the galloping rainbow."



TABLE 3.4 MUIR'S WILDFLOWER SAMPLE AT HILLS FERRY

Natural Order [family]	No. of Flowers		No. of Species
Gramineae	29,830	Panicles 1,000	3
Compositae	132,125	Heads 3,305	2
Leguminosae	2,620		2
Umbelliferae	620		1
Polemoniaceae	401		2
Scrophulariaceae	169		1
_____?	85		1
Rubiaceae	40		1
Geraniaceae [<i>Erodium?</i>]	22		1
Musci	1,000,000		
	Funaria and Dicranum		

SOURCE: Muir (1974).

NOTE: Number of natural orders, 9 to 10; of species, 16; total number of open flowers, 165,912; mosses, 1,000,000.



Pacheco Pass

C. King. 1861. A great inland prairie sea, extending for 500 miles, ...now a broad arabesque of colors.

Muir. 1868. All the ground was covered..... with radiant corollas... Hundreds of these happy sun-plants brushed against my feet at every step, ...as if I were wading in liquid gold.

Boudet. 1880. ...general rainbow effects I have never seen equaled.



Brewer and Watson. *Eschscholzia californica*. "...large areas are made painfully brilliant by its intense glow in the bright sunshine."



BUNCH GRASS -- Not recorded in mission bricks.

Frémont 1844. Foothills east of Sacramento. Hills generally covered with a species of geranium (*erodium cicutarium*)...with this was frequently interspersed good and green bunch grass...

Bryant 1848. Coast range west of Sacramento: he saw with the wild oats, "tufts or bunches of a species of grass, which remains green through the whole season."



Nessella (Stipa) pulchra

Central Valley Barrens

Wilkes 1849. "The western side [of the San Joaquin Valley]...is entirely barren and useless.

Muir 1906 ... the shrunken mass of leaves and stalks of the dead vegetation crinkle and turn to dust beneath the foot, as if it had been baked in an oven.



VTM SURVEY (ca. 1930)



Summer barrens in the interior



Valle poco pastoso, lomeria esteril

Diseño Rancho del la Laguna de Temecula

Brewer. ...barren hills of Temescal

Rancho Omochomne



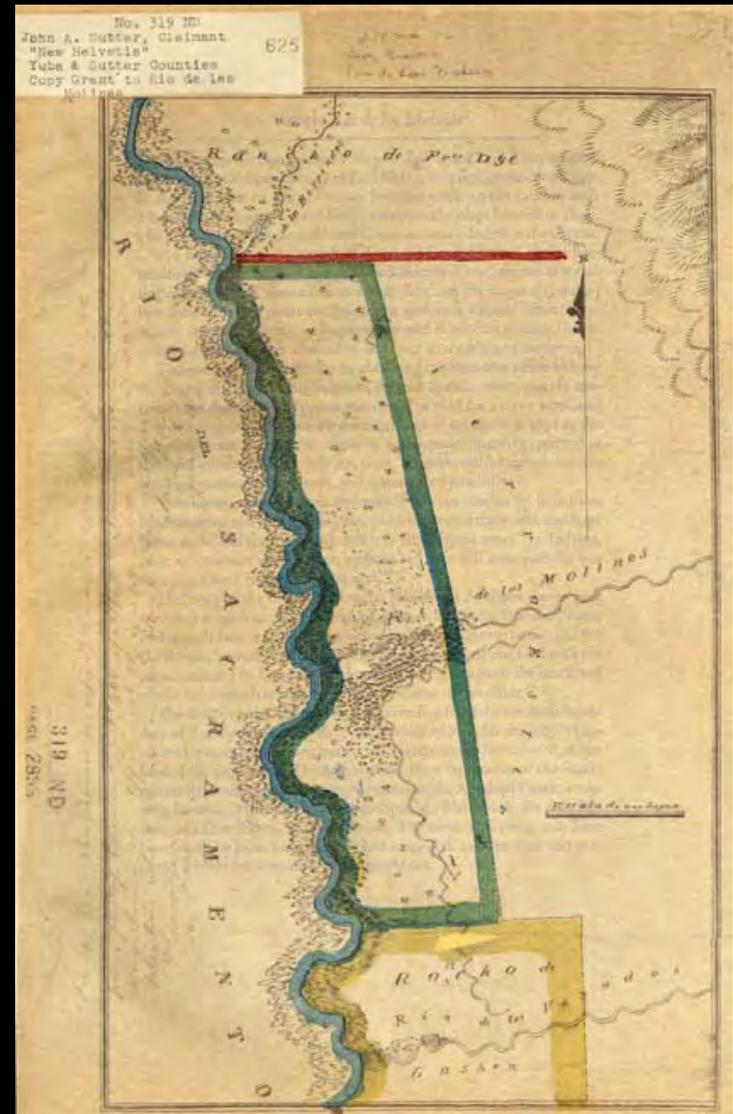
Terenos altos con poco pastos

Rancho Tolenas diseño,
Solano County

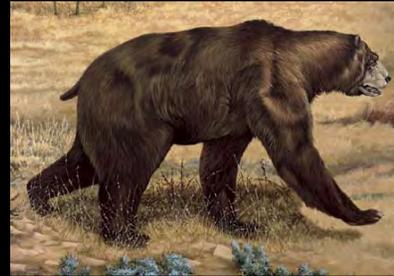
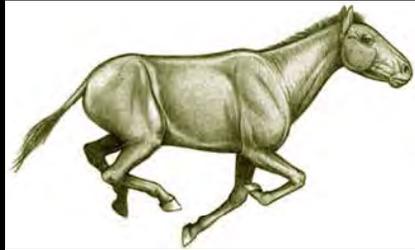
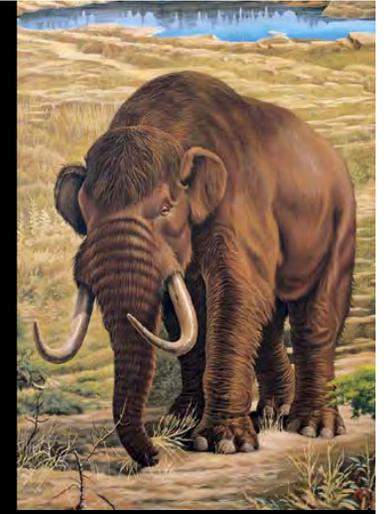
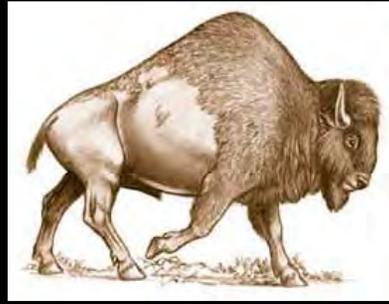


Courtesy, Bancroft Library
University of California Berkeley

Rancho New Helveta (Sutter)



Tierra esteril

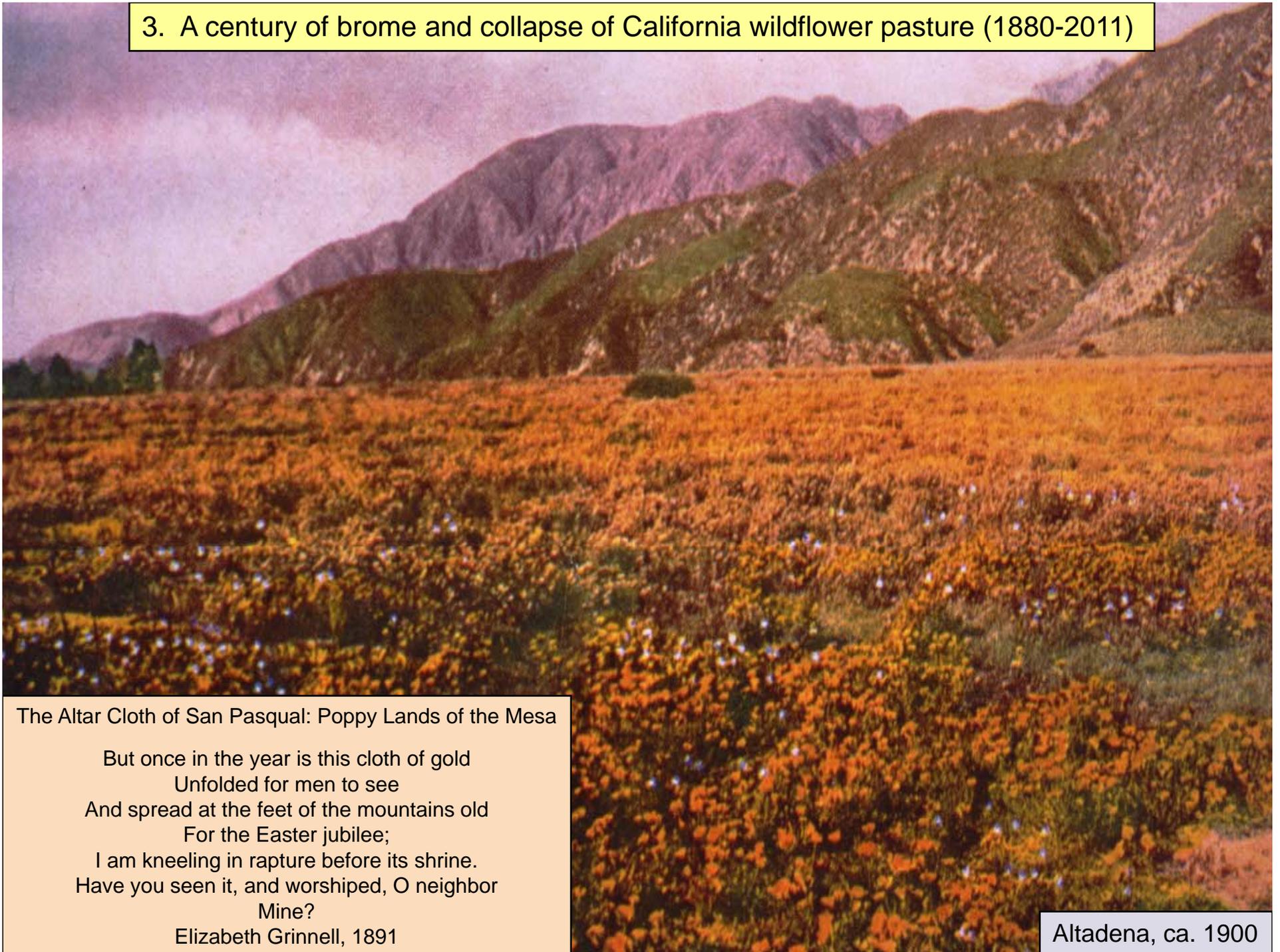


Pleistocene and modern megafauna

TABLE 3.7 FOSSIL WILDFLOWERS AND BUNCH GRASSES
IN PACKRAT MIDDENS IN THE MOJAVE AND SONORAN DESERTS

Source	Mead and Phillips 1981	Spaulding 1983 Marble Mtns., Owl Canyon, of Rocks	Cole 1986 Picacho Peak Point	King 1976 Lucerne Valley River Valley Late Pleistocene- Holocene	King and Van Devender 1977 Lower Colorado Late Pleistocene- Holocene	Cole and Webb 1985 Greenwater Valley Late Holocene
Location	Grand Canyon					
Period	Pleistocene	Late Pleistocene	Late Pleistocene			
<i>Amsinckia</i>	X	X	X	X	X	X
<i>Argemone</i>	X	X				
<i>Aristida</i>			X			
<i>Astragalus</i>		X	X	X		
<i>Castilleja</i>				X	X	X
<i>Chorizanthe</i>		X	X			
<i>Cirsium</i>	X	X		X		
<i>Cryptantha</i>		X	X		X	
<i>Dithyrea</i>						X
<i>Draba</i>			X			
<i>Eriogonum</i>		X		X		
<i>Eschscholzia</i>				X	X	
<i>Euphorbia</i>			X			
<i>Gilia</i>		X			X	X
<i>Hilaria</i>			X			
<i>Lepidium</i>	X	X	X		X	X
<i>Lupinus</i>			X	X		
<i>Malvastrum</i>				X		
<i>Mentzelia</i>		X				X
<i>Mirabilis</i>		X				
<i>Oryzopsis</i>			X			
<i>Penstemon</i>		X			X	
<i>Perityle</i>			X			
<i>Pectocarya</i>		X				
<i>Phacelia</i>	X		X	X	X	
<i>Plagiobothrys</i>			X		X	
<i>Plantago</i>		X			X	
<i>Solanum</i>					X	
<i>Stephanomeria</i>						X
<i>Stipa (Nassella)</i>		X	X			X
<i>Vulpia (Festuca)</i>			X			
Other grasses					X	

3. A century of brome and collapse of California wildflower pasture (1880-2011)



The Altar Cloth of San Pasqual: Poppy Lands of the Mesa

But once in the year is this cloth of gold
Unfolded for men to see
And spread at the feet of the mountains old
For the Easter jubilee;
I am kneeling in rapture before its shrine.
Have you seen it, and worshiped, O neighbor
Mine?

Elizabeth Grinnell, 1891

Altadena, ca. 1900

Parish (1920). In the San Bernardino Valley, these bromes were first noticed in the spring of 1888. They continued to spread with increasing rapidly, and in a very few years large patches... could be found in all parts of the valley and the surrounding hills. They are now among the most wide-spread, abundant and well established grasses of the region. As a result, some delicate indigenous herbs, formerly abundant, are now rare. Both species are sparingly eaten when young by stock, but are practically worthless as forage, and soon drying up they become a serious fire menace.



Bromus rubens



Bromus diandrus

Bromus rubens

Davidson 1907. "It was rare and local in Los Angeles County in 1892, but now [1907] may be found in many parts of the county, even as far as the Mojave Desert.

Bromus diandrus

Davidson. 1893. Already frequent in the waste grounds throughout the city and rapidly spreading.

Jepson 1901. Now one of our most abundant grasses.



Avena barbata, 1890s



Brassica geniculata, 1905
(*Hirschfeldia incana*)



Brassica tournefortii, 1970

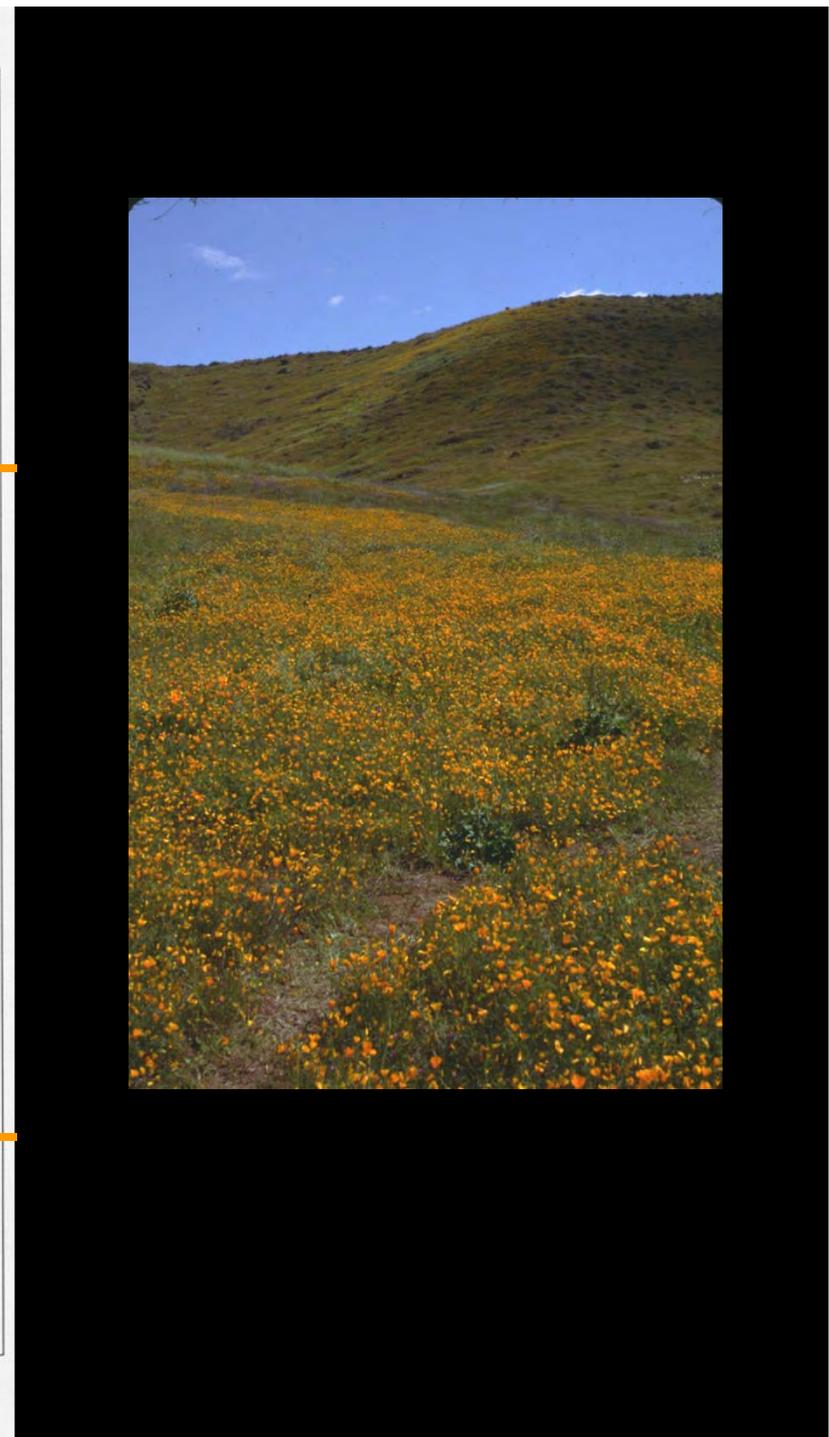
“Second wave invaders”



Schismus barbatus, 1940s

Table 5.3: Flower reports near Riverside¹

Year	PON ³	Comments
1884-85	89	-
1885-86	94	April 27...[there were] myriads of beautiful flowers.....that bedeck our...fields.
1886-87	59	-
1887-88	117	April 14. ...through the plains...[the] flower(s) perfuming the air everywhere meets the eye. On the abrupt rocky hills, are beds of yellow and blue flowers.....
1888-89	156	March 9. The wildflowers have not been so abundant this winter as last. The rains were not continuous enough.
1889-90	185	February 23. Immense field of poppies..[at] the mesa lying at the base of Mt. Cucamonga.
1890-91	129	February 28. Vegetation of all kinds is springing up and hills are taking on a delightful greenish tint....In a few days, the golden poppy will tint the hill-sides with a warm, rich yellow, and beautiful flowers of a hundred different varieties [species] and hues will deck the are plains [with] many colors. March 28. The Box Springs hills are covered with masses of golden poppies.
1891-92	65	-
1892-93	124	March 23. Wildflowers are becoming very abundant, especially the beautiful golden poppy. April 1. The drive down the valley, following the canal [east Riverside], is one of great beauty at this season of the year. The hills are covered with a carpet of emerald green bedecked with beautiful wildflowers. The air is sweet with the fragrance.....and the exhalations of blossoms so numerous as to seem like solid beds of yellow, and blue, and white..." April 17. ...people gather gorgeous wildflowers upon the broad expanse of the plains and the sloping mesas, or to wander among the charming nooks and corners of the many beautiful canyon retreats (LA Times).
1893-94	71	May 3. Dry weather has affected the wildflowers (Los Angeles Times)
1894-95	164	March 31. The hillsides were never so gorgeously beautiful with wildflowers [Murrieta]. ²
1895-96	75	-
1896-97	128	March 25. West Riverside seems to have quite an attraction for wild-growing flowers, especially poppies..... ²
1897-98	55	-
1898-99	48	-
1899-00	69	-
1900-01	122	February 26. ...dainty wildflowers on the hills.
1901-02	70	-
1902-03	129	March 6, 1903. The golden poppies are again in bloom; also cream cups, baby blue eyes, and several other small varieties. April 3. [Corona] The mesa is covered with wildflowers.
1903-04	57	-
1904-05	168	March 6. Those going to Coldwater Canyon report...they found such a profusion of wild flowers as they had never seen before. March 18. In has been many days [years] since there has been such an abundance of wildflowers, as are now to be found in this neck of the woods. This morning, crowds of school children and tourists were out on Rubidoux Hill, where they were gathering the beauties by the handful and the armload. March 20. Spare the poppies. But if the crowds of people and children who have been engaged in pulling up these beautiful flowers do not show more discretion, the poppies will not be there next year...Therefore, all persons who want Riverside to have these poppies in great profusion are urged not to pick the flowers now making Rubidoux Hill so attractive.



1. Source, *Riverside Press and Horticulturalist*, unless otherwise indicated.

2. Source, *Riverside Enterprise*.

3. PON, percent of normal precipitation. Mean 25.4 cm.



The Alter Cloth of San Pasqual circa 1900, Charles Frances Saunders



Altadena poppy field visited by rail from Los Angeles

ca. 1895

Table 5.4. Observations of poppy and wildflower fields at Los Angeles and Pasadena, reported in the Los Angeles Times.

Year	Precip. ³ PON	Flower abundance	Precipitation pattern	Dates of flower observations in Los Angeles Times (July to June)
1886-87	94	**	Feb, Apr	April 27, May 24.
1887-88	93	***	Winter/spring	January 2, February 23, March 11, 29.
1888-89	129	-	Mid-winter drought	-
1889-90	233	***	Fall/winter floods	Dec 6, Jan 28, 29, 30, 31, Feb 11, March 16, 22, April 12.
1890-91	89	**	Heavy/ February	Feb 7, March 9, 26.
1891-92	79	**	Spring	March 12, 27, April 7.
1892-93	176	***	Evenly distributed	February 11, March 10, May 21.
1893-94	45	*	December	February 2, March 18, May 3.
1894-95	108	***	Winter/late spring	March 10, March 28, 31, April 9, 25, 28, 26. July 22.
1895-96	57	**	Jan/March	January 1, March 1, March 17.
1896-97	113	***	Evenly distributed	February 2, 6, April 10.
1897-98	45	*	Winter/spring drought	February 23.
1898-99	37	*	Jan/March	March 20.
1899-00	53	*	Fall/winter drought	January 10. Fall rains. Reports flowers are scarce
1900-01	109	***	Evenly distributed	February 27, March 1, 3, 8.
1901-02	71	*	Spring	March 1.
1902-03	129	**	Evenly distributed	February 14, March 14,
1903-04	58	-	Late spring	-
1904-05	131	**	Winter/spring	May 15.
1905-06	124	***	Winter/spring	February 18, 25, March 15, 26.
1906-07	129	**	Winter/spring	January 31, March 21, 29.
1907-08	78	**	Winter	February 24, 26, April 1.
1908-09	128	***	Evenly distributed	January 28, February 7, 23. March 11, 21 April 21.
1909-10	84	*	December	February 13, March 8, 28, April 2.
1910-11	108	***	Winter/spring	February 5, April 11.
1911-12	77	**	Mid-winter drought,	March 11, April 1, 19, 28.
1912-13	89	***	Jan/Feb	March 13, 30, April 11, 13, 18. June 7.
1913-14	158	**	Fall/winter, flooding	March 9.
1914-15	114	**	Winter	March 8, April 3, 4, 19.
1915-16	133	**	Winter, flooding	February 6, March 30.
1916-17	93	*	Fall/winter	May 13.
1917-18	93	*	Late spring	May 1.

1. Flower abundance: - no report, * local, **normal, ***unusually abundant.

2. Los Angeles CBD

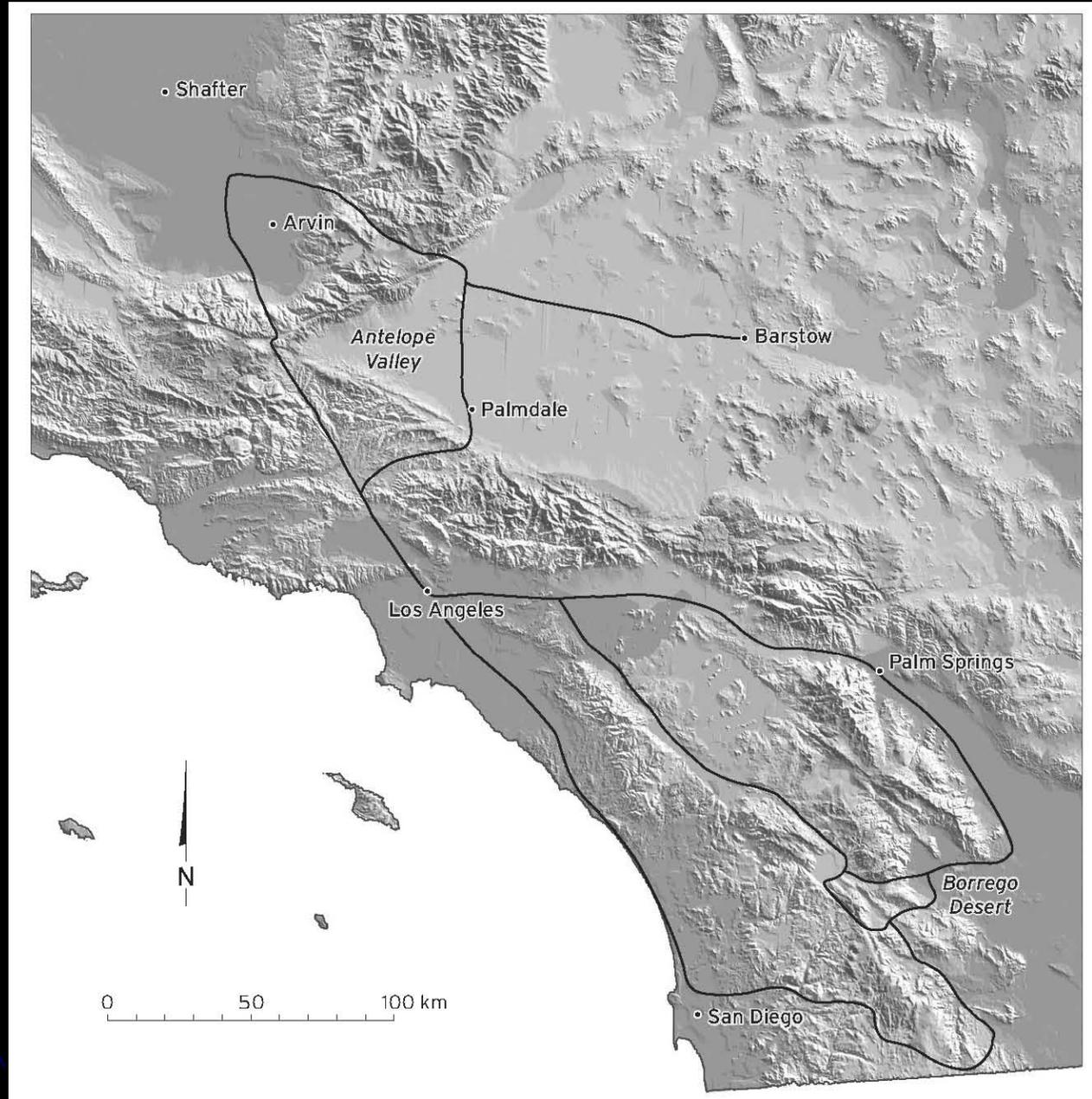
3. PON, percent of normal precipitation, July-June. Mean, 38.0 cm.

Wildflower “circle tours.”

The Los Angeles *Times*

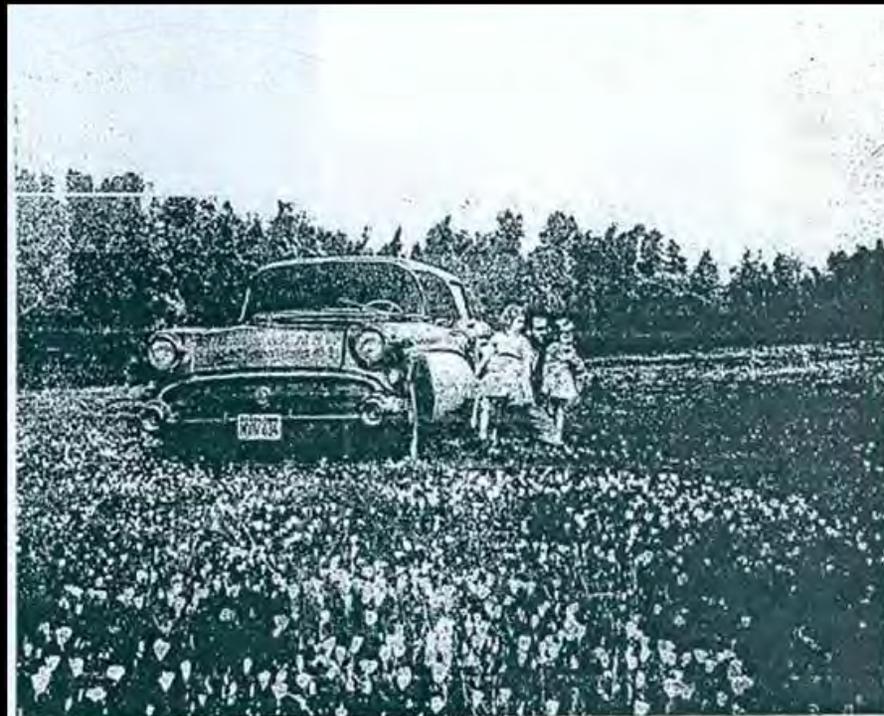
Automobile Club of
Southern California

The Desert Magazine
(Randall Henderson)



Los Angeles *Times*
Articles by Lynn Rogers,
Lee Shippey and others.

The Desert Magazine
(Randall Henderson)



Wildflower Tour Recalls History

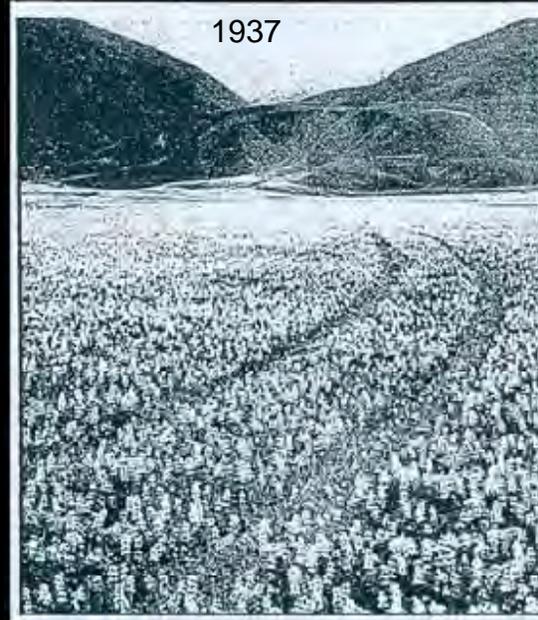
BY LYNN ROGERS, Automobile and Outdoor Editor
Since Padre Francisco Garcés crossed the Kern River, near the present site of the Odoese Ranch at the mouth of Kern River Canyon, on May 1, 1776, millions of motorists have driven through the canyon during the spring months to view the wildflower displays along its slopes.

It could well be that Garcés, the first white man to travel through the area, was also the first to behold the brilliant showings of these flowers in the canyon and over the countryside to the south, east and west. For many years the region around Bakersfield and

VISITORS PARK new Buick Century Caballero at end of road leading into one of the colorful poppy fields in the Edison region located southeast of Bakersfield.



Lynn Rogers
Since Padre Francisco Garcés cross the Kern River, near the present site of the Odoese Ranch at the mouth of Kern River Canyon, on May 1, 1776, millions of motorists have driven through the canyon during the spring months to view the wildflower displays along its slopes.



Southern San Joaquin Valley, Arvin



1941



1952



1957



San Geronio Pass in the 1910s, Charles Frances Saunders



Western Mojave Desert, 1936

National Geographic, 1929



© National Geographic Society

Autochromes by Charles Martin

IN SPRINGTIME THE DESERT BURSTS INTO BLOOM

Coreopsis with its gorgeous blossoms, many of them three inches across, literally carpets Antelope Valley, Los Angeles County, in April and May. These flower patches gleam for miles.

Poppies in Pomona, 1937





Bakersfield Lupines
1939

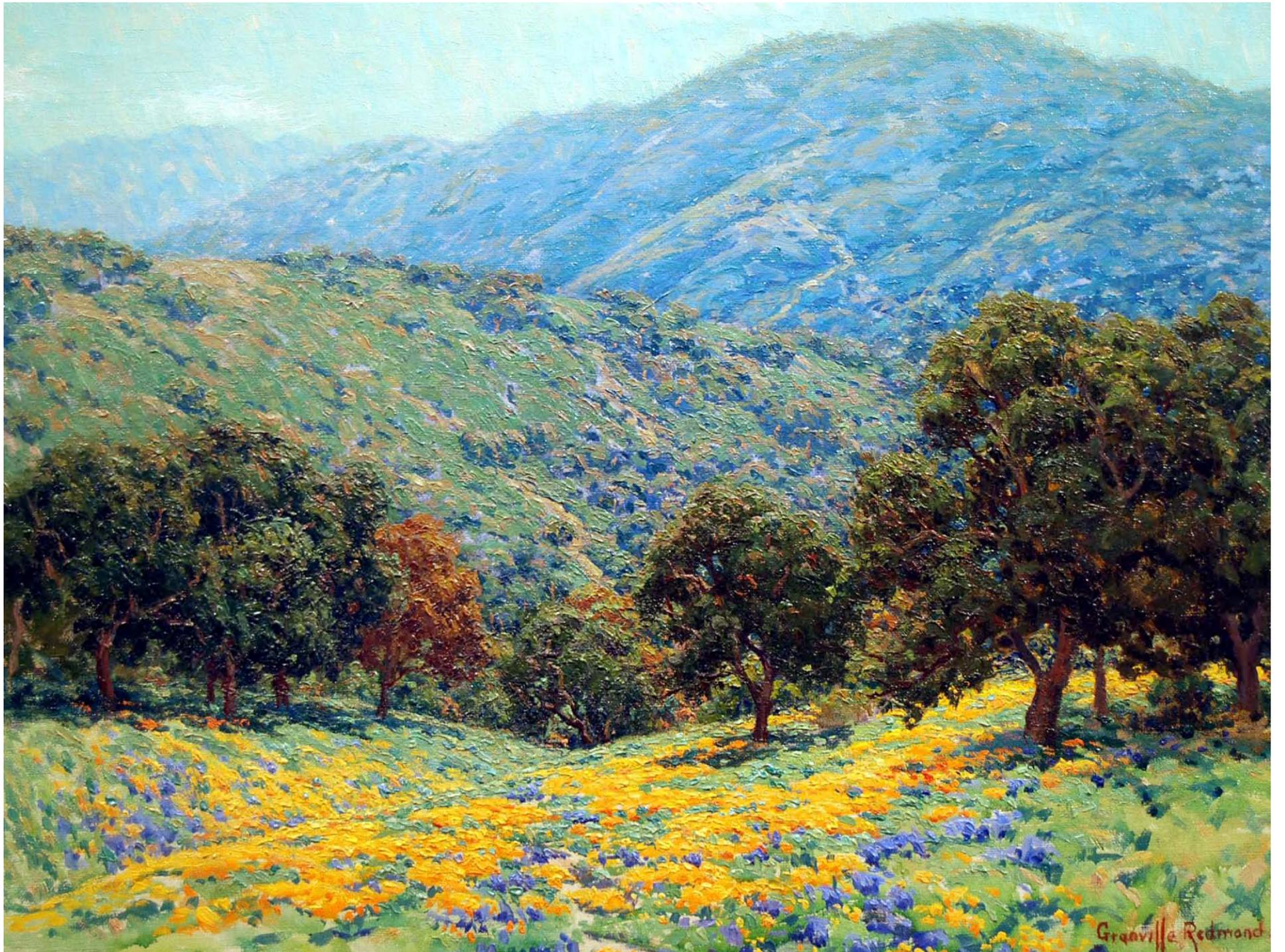
- The blue lupine field at the Grapevine was “broken up by small patches of golden poppies, evening snow, sun cups, owls clover and other smaller varieties.”



J. Raymond Minnich

Arvin and Shafter flower festivals









Reports of wildflowers in southern California since 1920

Table 5.6. Reports of flowers in southern California since 1918¹

Year/ Region	LA PON	LA FLR	Riv PON	Riv FLR	BAK PON	Kern FLR	Plm PON	Ant Val. FLR	Moj. Des. FLR	PS PON	Coa Val. FLR	DV PON	Death Val. FLR	Cen Calif. Interior
1918-19	57	-	99	-	80	-	80	**	-	61	-	nd	-	nd
1919-20	84	*	119	**	85	-	102	-	-	148?	-	nd	-	nd
1920-21	91	**	102	-	112	-	89	-	-	59	-	nd	-	nd
1921-22	131	**	203	***	142	***	133	***	***	224	***	nd	-	nd
1922-23	64	-	94	-	95	-	89	-	-	6	-	nd	-	nd
1923-24	44	*	84	*	59	-	44	-	-	24	-	nd	-	nd
1924-25	53	-	79	-	74	***	54	-	-	28	-	nd	-	nd
1925-26	117	-	140	-	81	***	89	**	-	177	**	nd	-	nd
1926-27	119	*	142	**	100	***	121	***	***	132	***	nd	-	***
1927-28	68	*	116	-	95	**	60	**	*	83	**	nd	**	-
1928-29	85	**	80	-	72	**	76	**	**	109	**	nd	**	**
1929-30	77	**	130	**	77	**	78	**	**	152	*	nd	-	-
1930-31	84	-	118	-	93	**	74	**	-	118	**	nd	-	-
1931-32	113	**	150	***	151	***	130	***	-	242	***	nd	***	**
1932-33	79	**	91	**	113	*	80	*	*	84	**	nd	-	**
1933-34	97	**	47	**	36	*	71	**	**	47	**	nd	-	**
1934-35	145	**	120	***	135	***	134	***	***	160	**	128	***	***
1935-36	81	-	111	*	77	-	80	-	-	113	*	13	-	-
1936-37	143	*	218	**	152	***	163	***	***	225	**	171	-	**
1937-38	157	*	121	*	81	***	146	**	**	70	**	61	-	*
1938-39	87	*	108	**	110	**	137	***	***	130	**	207	**	*
1939-40	128	*	108	**	116	**	97	**	***	176	***	167	**	**
1940-41	219	**	230	***	186	***	232	***	***	221	***	156	**	**
1941-42	74	-	98	-	81	-	55	-	*	181	-	89	*	**
1942-43	122	-	152	-	169	*	163	-	-	223	-	75	-	-
1943-44	128	-	158	-	83	**	118	**	**	210	-	118	-	-
1944-45	77	-	96	-	135	**	57	**	*	75	-	57	-	-
1945-46	78	-	88	-	81	-	68	-	*	130	-	68	-	-
1946-47	84	-	91	-	82	**	159	**	*	55	*	159	-	-
1947-48	48	-	62	-	71	-	42	-	*	73	-	42	-	-
1948-49	53	-	77	*	65	***	105	**	**	111	***	105	-	-
1949-50	71	*	70	-	78	***	9	*	-	26	-	9	-	-
1950-51	55	*	56	-	88	**	58	-	-	30	-	58	-	*
1951-52	175	-	175	***	139	***	118	**	***	160	***	118	-	***
1952-53	63	-	96	-	99	**	49	*	**	137	-	49	-	-
1953-54	81	*	97	-	71	*	65	*	*	122	*	65	-	*
1954-55	80	-	83	-	74	**	90	*	*	83	*	90	**	*
1955-56	107	-	74	-	63	**	19	-	-	51	-	19	-	**
1956-57	64	-	98	-	75	**	86	**	*	75	**	86	-	**
1957-58	141	-	159	**	161	***	85	***	***	135	**	85	**	***
1958-59	37	-	43	-	39	**	65	-	-	45	-	65	-	-
1959-60	59	-	76	-	67	*	124	-	-	74	-	124	-	-
1960-61	32	-	29	-	65	*	33	-	-	29	-	33	-	**
1961-62	125	-	95	**	103	**	130	**	**	48	-	77	-	**
1962-63	58	-	55	**	73	**	36	-	-	50	-	59	-	*
1963-64	53	-	98	-	74	**	93	*	-	117	-	69	-	*
1964-65	91	-	80	**	92	**	44	*	**	64	*	108	-	*
1965-66	137	*	126	**	83	*	124	*	**	187	**	93	-	*
1966-67	147	*	120	**	114	**	89	**	**	107	**	36	-	*
1967-68	111	-	86	-	99	-	86	-	-	89	-	128	-	*
1968-69	183	-	193	-	141	**	145	-	-	143	*	122	-	-
1969-70	52	-	62	-	54	-	33	-	*	76	-	98	-	-
1970-71	82	-	63	-	107	-	73	*	*	42	-	55	-	-
1971-72	48	-	49	-	48	-	59	-	-	25	-	61	-	-
1972-73	142	*	120	**	128	***	103	**	**	80	**	167	***	***
1973-74	99	-	77	-	80	-	68	**	*	75	-	87	-	-
1974-75	96	-	71	-	108	-	71	*	-	44	-	120	-	-
1975-76	48	-	77	-	70	-	37	-	-	86	-	158	-	-
1976-77	82	-	82	-	67	-	136	-	**	129	**	125	-	-
1977-78	223	-	218	**	204	***	190	**	**	213	***	233	-	-
1978-79	132	-	152	-	107	-	143	-	-	130	-	90	-	-
1979-80	180	-	165	-	105	-	174	-	-	304	*	142	-	-
1980-81	60	-	59	-	77	-	60	-	-	47	-	45	-	-
1981-82	72	-	128	-	102	-	120	-	-	72	-	115	-	-
1982-83	209	-	184	-	156	-	190	-	-	164	*	155	-	-
1983-84	70	-	98	-	84	-	51	-	-	156	-	86	-	-
1984-85	86	-	75	-	65	-	88	*	-	56	-	90	-	-
1985-86	120	-	104	-	107	-	68	*	*	112	-	50	-	-
1986-87	51	-	56	-	90	-	42	*	*	85	-	90	-	-
1987-88	83	-	98	-	95	-	111	**	**	32	**	265	**	-
1988-89	54	-	66	-	60	-	50	-	-	32	-	31	-	-
1989-90	49	-	56	-	54	-	33	-	-	25	-	31	-	-
1990-91	77	*	104	-	96	-	86	**	-	92	-	81	-	*
1991-92	141	-	111	-	96	*	158	**	-	143	**	119	-	*
1992-93	183	-	208	-	150	**	224	*	-	243	**	162	-	*
1993-94	54	-	93	-	93	-	45	*	-	48	-	11	-	-
1994-95	164	-	189	-	149	-	116	**	-	167	**	157	-	-
1995-96	83	-	73	-	105	-	49	-	-	25	-	33	-	-
1996-97	83	-	113	-	103	-	46	*	-	26	-	44	*	*
1997-98	207	-	253	*	232	-	203	**	**	176	***	279	***	-
1998-99	61	-	64	-	110	-	33	-	-	15	-	57	-	-
1999-2000	120	*	85	**	89	**	77	-	-	32	-	52	-	*
2000-01	29	-	34	-	56	-	28	-	-	84	*	124	-	*
2001-02	110	-	128	**	95	**	113	*	-	6	**	21	-	-
2002-03	62	-	70	-	73	-	64	-	-	70	**	97	-	-
2003-04	249	-	229	*	147	*	251	**	***	241	***	321	***	**

Wildflowers disappear from the coastal plain

Blooms throughout southern California in normal and wet years, more frequent in the coast than in the interior.

Wildflowers displaced by brome grassland in the interior valleys and central valley

Wildflowers decline with red brome invasion of the deserts

First brome crash, flower outbreaks in the Sonoran Desert

The great drought of 1999-2002, flower outbreaks in interior southern California, Carrizo Plain, Bakersfield

Second brome crash, flower outbreaks in Sonoran and Mojave Deserts

California today: Red brome and ripgut brome grassland



Box Springs Mountains, Riverside



Study the following time-series and propose relationships between exotic annual grasses and native wildflowers.

1. Biomass and rainfall
2. Species composition and rainfall
3. Under what circumstances were natives most abundant?
4. Could you have determined these relationships with a “one-time only” visit.

Two Trees Canyon-1 (burn in March 1988)

1989

Precipitation 6.44"

1.6 tons ha⁻¹

Phacelia distans
Brassica geniculata
Cryptantha intermedia
Erodium cicutarium

The square rock is in the upper right
of most photographs



1990

Precipitation 5.53"

2.5 tons ha⁻¹

Phacelia distans

Cryptantha intermedia

Erodium cicutarium



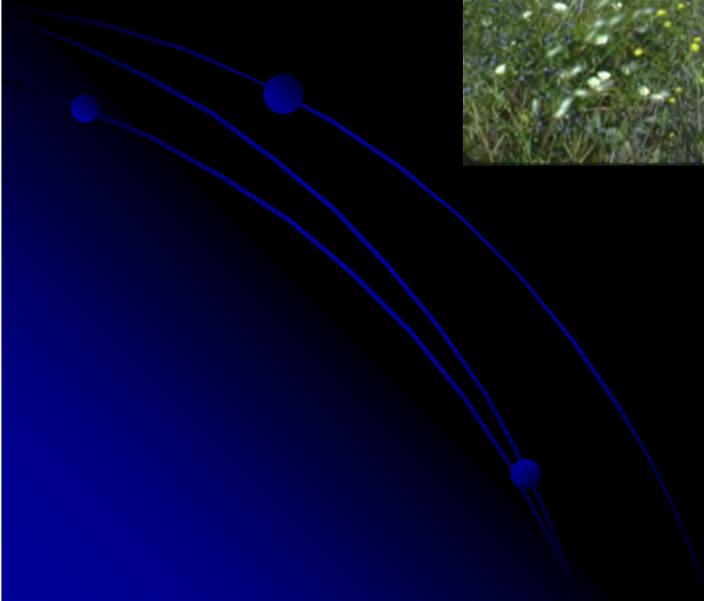
1991

Precipitation 10.38"

2.5 tons ha⁻¹

Phacelia distans

Cryptantha intermedia



1992

Precipitation 11.05"

1.8 tons ha⁻¹

Phacelia distans



1993

Precipitation 20.70"

3.3 tons ha⁻¹

Phacelia distans
Bromus rubens

